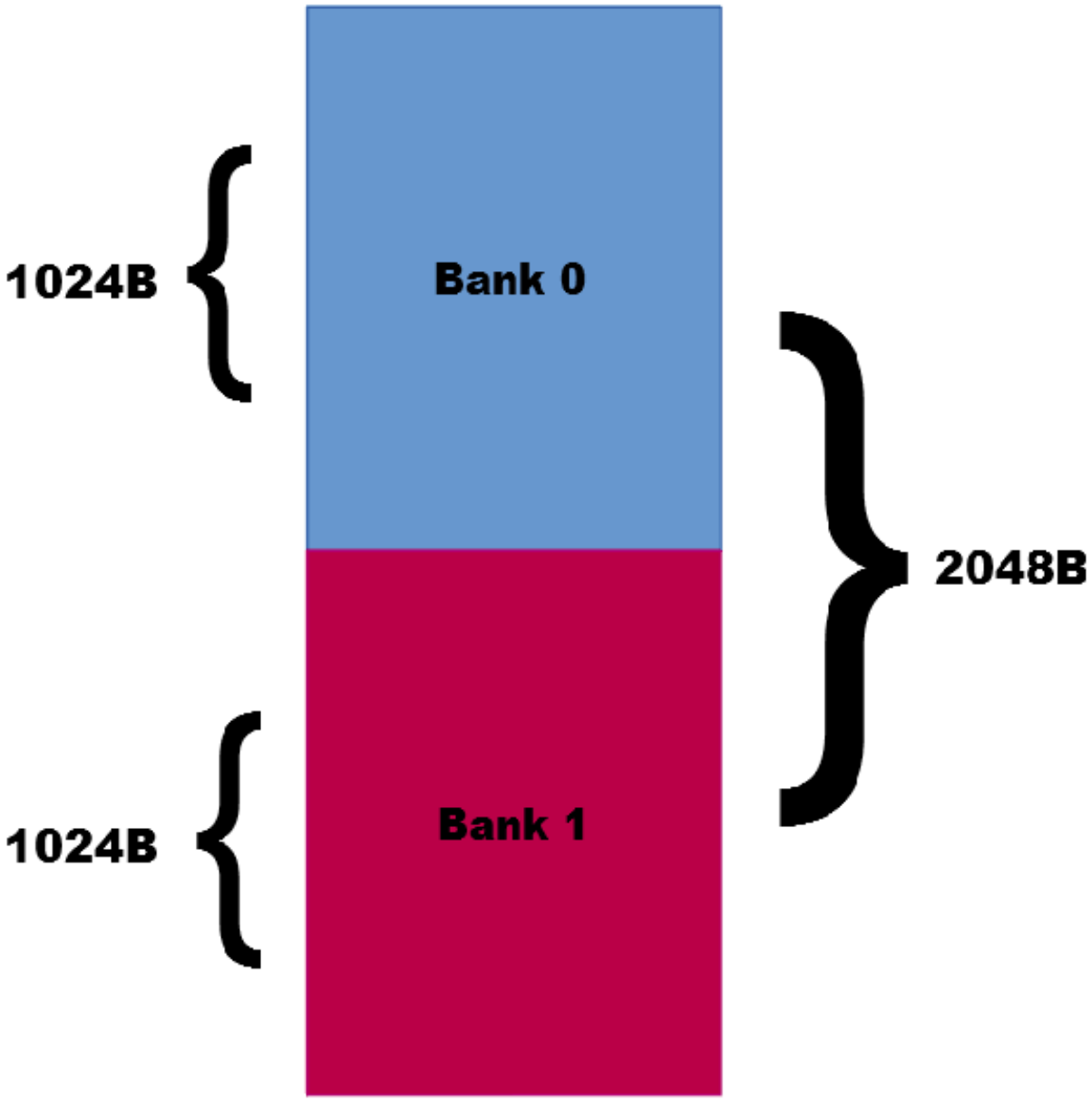
**Help Center**

# Banks

## Banks

The **BANK** is a logical unit of NAND memory space. When NAND memory has quite big amount of blocks (physically), but controller wants to reduce addresses it divides all available blocks into groups (banks). For instance, if NAND memory chip has 2048 physical blocks, but controller addresses 1024 blocks only (0-1023), it divides whole NAND memory space into 2 equal parts so the blocks that are allocated physically in the first part belong to the first bank while blocks from the second part belong to the second one. Thus both banks have logical blocks addressed from LBN 0 to LBN 1023 (Hex: 0000-03FF). Banks arranged sequentially within physical space while blocks are mixed within the bank. There might be 2/4/8/16 banks.



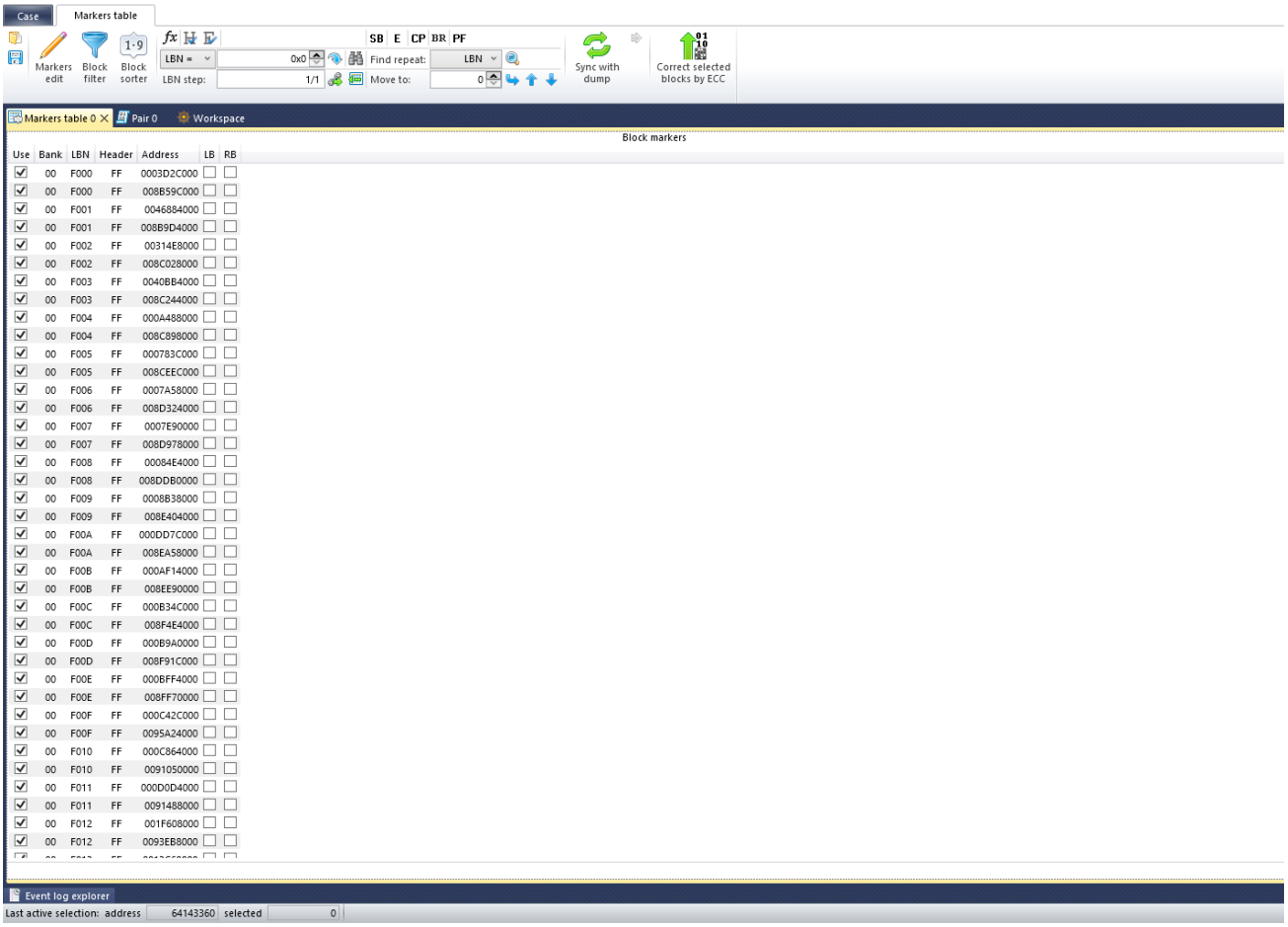

# How to understand whether controller used banks or not ?

There's no simple way to figure out if controller used banks until markers table with initial block allocation is built.
If during block sequence analysis we noticed that majority of LBNs are duplicated 2/4/8 times having very different physical address (located physically in different parts of NAND memory) it means that the controller uses banks.

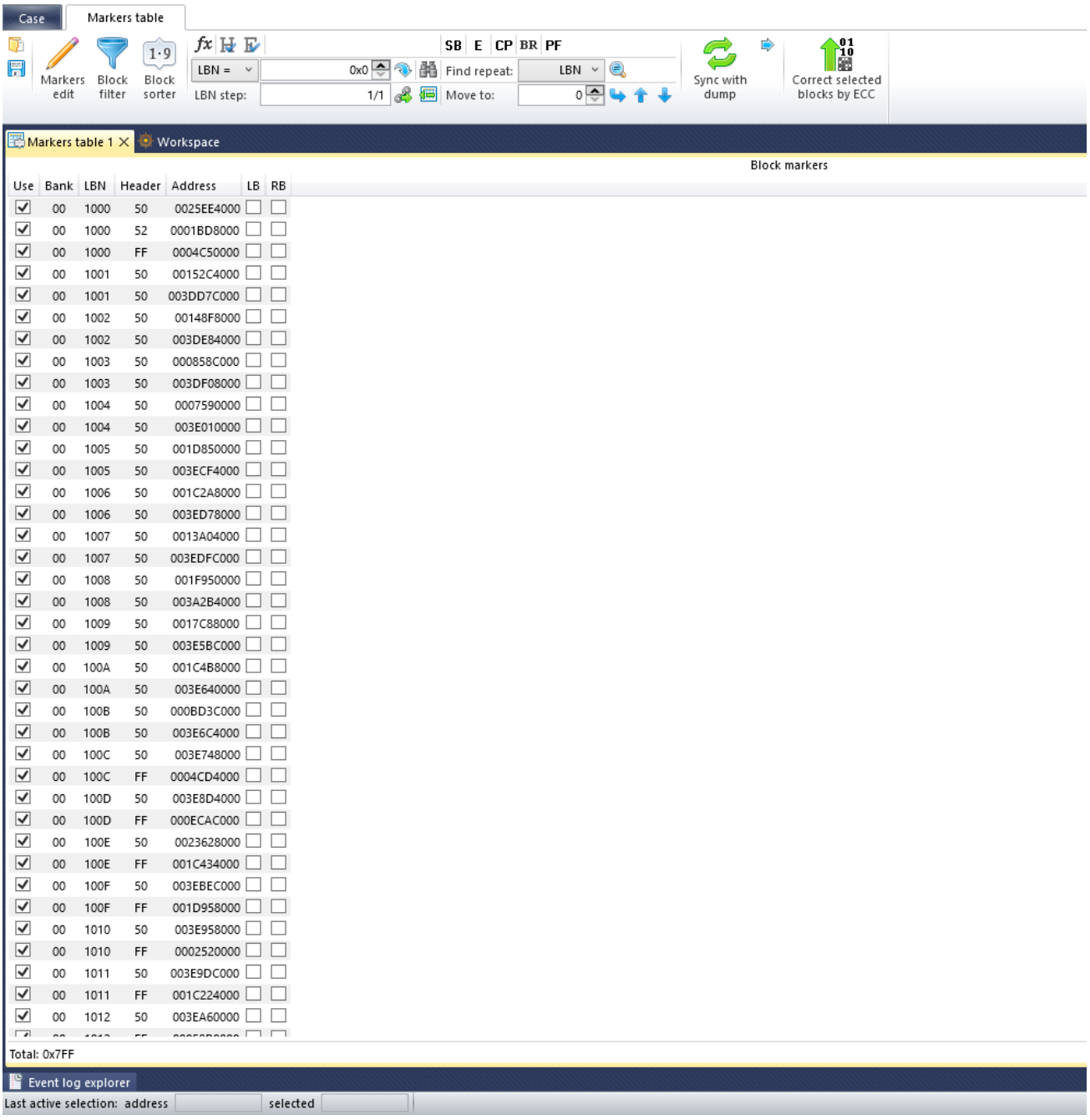
Pictures below show how multiple banks look like in MARKERS TABLE .

As we can see, dump below have duplicated LBN's and each duplicated block have different address, so there are 2 banks in this cases.

Example 1



## Example 2


Case
Markers table
Markers edit
Block filter
Block sorter
SB E CP BR PF
LBN =
0x0
LBN step:
1/1
Find repeat:
LBN
Move to:
0
Sync with dump
Correct selected blocks by ECC
Markers table 1
Workspace
Block markers
Use Bank LBN Header Address LB RB
00 1000 50 0025EE4000
00 1000 52 0001BD8000
00 1000 FF 0004C50000
00 1001 50 00152C4000
00 1001 50 003DD7C000
00 1002 50 00148F8000
00 1002 50 003DE84000
00 1003 50 000858C000
00 1003 50 003DF08000
00 1004 50 0007590000
00 1004 50 003E010000
00 1005 50 001D850000
00 1005 50 003ECF4000
00 1006 50 001C2A8000
00 1006 50 003ED78000
00 1007 50 0013A04000
00 1007 50 003EDFC000
00 1008 50 001F950000
00 1008 50 003A2B4000
00 1009 50 0017C88000
00 1009 50 003E5BC000
00 100A 50 001C4B8000
00 100A 50 003E640000
00 100B 50 000BD3C000
00 100B 50 003E6C4000
00 100C 50 003E748000
00 100C FF 0004CD4000
00 100D 50 003E8D4000
00 100D FF 000ECAC000
00 100E 50 0023628000
00 100E FF 001C434000
00 100F 50 003EBEC000
00 100F FF 001D958000
00 1010 50 003E958000
00 1010 FF 0002520000
00 1011 50 003E9DC000
00 1011 FF 001C224000
00 1012 50 003EA60000
Total: 0x7FF
Event log explorer
Last active selection: address selected

Example 3

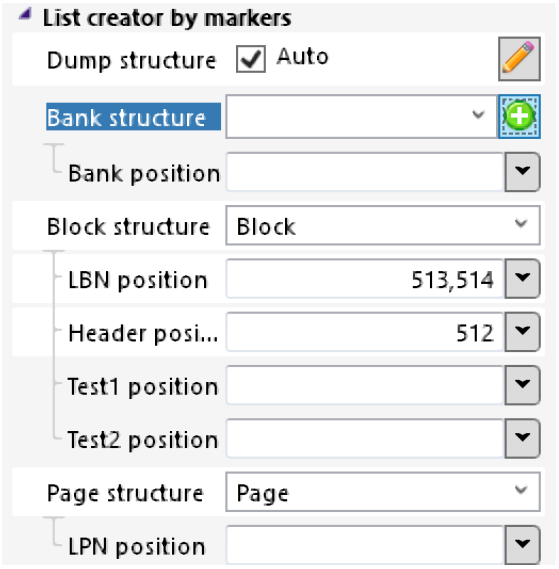
Markers table 1

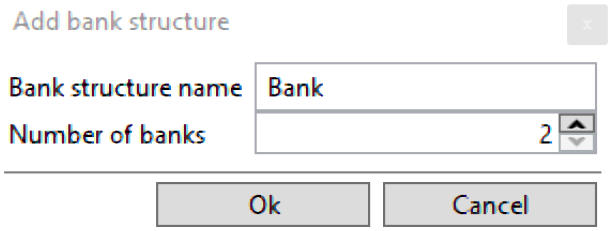
| Use | Bank | LBN | Header | Test 1 | Address | LB | RB |
|---|---|---|---|---|---|---|---|
| ☑ | 00 | 1000 | FF | 55AA | 0225E34000 | ☐ | ☐ |
| ☑ | 00 | 1000 | FF | 0000 | 0226078800 | ☐ | ☐ |
| ☑ | 00 | 1001 | FF | 0000 | 0102810000 | ☐ | ☐ |
| ☑ | 00 | 1001 | FF | 0000 | 0102A54800 | ☐ | ☐ |
| ☑ | 00 | 1002 | FF | 0000 | 00CB3B5000 | ☐ | ☐ |
| ☑ | 00 | 1002 | FF | 0000 | 00CB5F9800 | ☐ | ☐ |
| ☑ | 00 | 1003 | FF | 35CB | 0201E3D000 | ☐ | ☐ |
| ☑ | 00 | 1003 | FF | E5E1 | 0202081800 | ☐ | ☐ |
| ☑ | 00 | 1004 | FF | 8A05 | 02019B4000 | ☐ | ☐ |
| ☑ | 00 | 1004 | FF | 1517 | 0201BF8800 | ☐ | ☐ |
| ☑ | 00 | 1005 | FF | F1A5 | 020152B000 | ☐ | ☐ |
| ☑ | 00 | 1005 | FF | 2DDE | 020176F800 | ☐ | ☐ |
| ☑ | 00 | 1006 | FF | 187A | 02010A2000 | ☐ | ☐ |
| ☑ | 00 | 1006 | FF | FB9B | 02012E6800 | ☐ | ☐ |
| ☑ | 00 | 1007 | FF | 0F99 | 0200C19000 | ☐ | ☐ |
| ☑ | 00 | 1007 | FF | C161 | 0200E5D800 | ☐ | ☐ |
| ☑ | 00 | 1008 | FF | 0B17 | 0200790000 | ☐ | ☐ |
| ☑ | 00 | 1008 | FF | FEF7 | 02009D4800 | ☐ | ☐ |
| ☑ | 00 | 1009 | FF | 4BC9 | 0200307000 | ☐ | ☐ |
| ☑ | 00 | 1009 | FF | 0756 | 020054B800 | ☐ | ☐ |
| ☑ | 00 | 100A | FF | A30E | 01FFE7E000 | ☐ | ☐ |
| ☑ | 00 | 100A | FF | 33FB | 02000C2800 | ☐ | ☐ |
| ☑ | 00 | 100B | FF | C8D4 | 0206244000 | ☐ | ☐ |
| ☑ | 00 | 100B | FF | C8A3 | 0206488800 | ☐ | ☐ |
| ☑ | 00 | 100C | FF | D8C2 | 01FF9F5000 | ☐ | ☐ |
| ☑ | 00 | 100C | FF | D70B | 01FFC39800 | ☐ | ☐ |
| ☑ | 00 | 100D | FF | 9C21 | 01FF56C000 | ☐ | ☐ |
| ☑ | 00 | 100D | FF | FEFF | 01FF7B0800 | ☐ | ☐ |
| ☑ | 00 | 100E | FF | B850 | 01FF0E3000 | ☐ | ☐ |
| ☑ | 00 | 100E | FF | FA26 | 01FF327800 | ☐ | ☐ |
| ☑ | 00 | 100F | FF | 10F6 | 0203973000 | ☐ | ☐ |
| ☑ | 00 | 100F | FF | 5201 | 0203BB7800 | ☐ | ☐ |
| ☑ | 00 | 1010 | FF | 722F | 01FEC5A000 | ☐ | ☐ |
| ☑ | 00 | 1010 | FF | A308 | 01FEE9E800 | ☐ | ☐ |
| ☑ | 00 | 1011 | FF | FC41 | 01FE7D1000 | ☐ | ☐ |
| ☑ | 00 | 1011 | FF | DDF1 | 01FEA15800 | ☐ | ☐ |
| ☑ | 00 | 1012 | FF | 99AC | 01FE348000 | ☐ | ☐ |
| ☑ | 00 | 1012 | FF | 2984 | 01FE58C800 | ☐ | ☐ |
| ☑ | 00 | 1013 | FF | CB8F | 02034EA000 | ☐ | ☐ |
| ☑ | 00 | 1013 | FF | 75AB | 020372E800 | ☐ | ☐ |

In this example #3 LBN's are duplicated too, but physical addresses are very close so there's no banks. The block size should be adjusted in structure viewer (size should be doubled). This controller used multi-plane page allocation but in chip configuration the physical block size was set.

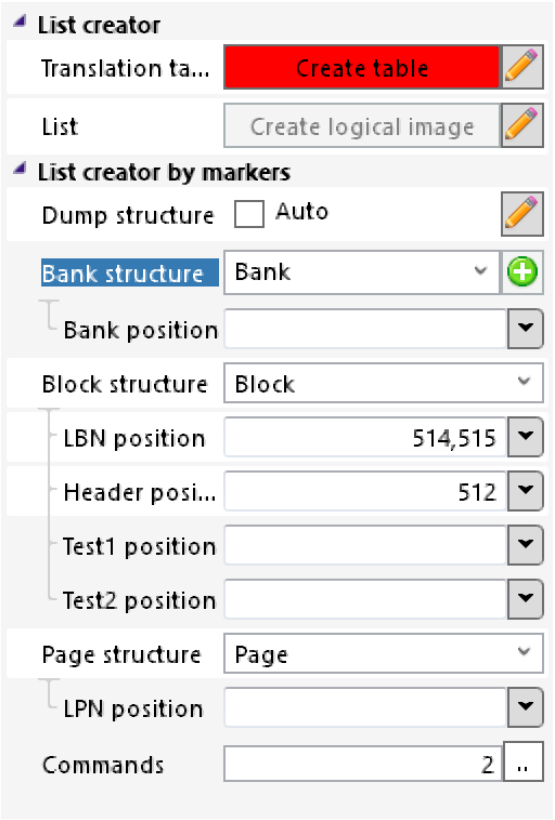
# How to add banks to MARKERS TABLE

To add banks number it's necessary to click on the green plus button from MARKERS TABLE parameters and then add number of banks.




Normally number of banks may be 2,4,8 and up to 32. When banks added it's necessary to
recreate table by clicking ' **Create table** ' and then sort/filter blocks.




## Practical cases

1. Open case in VNR
2. Check markers table
3. Find number of banks
4. Add banks to structure
5. Re-create markers table
6. Check how blocks got rearranged